Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Per: \_\_\_\_\_\_\_

Angry Birds – *The Parabolic Revenge!*

Geometry

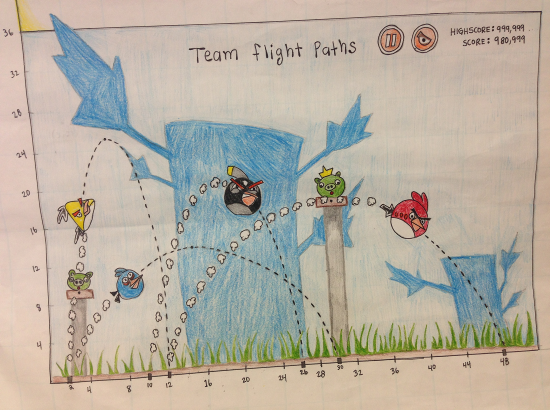
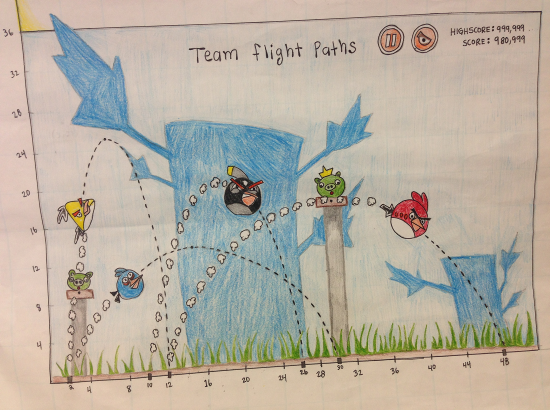
Due Date: Tuesday, June 2nd, 2015

Your group name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Red Bird, Yellow Bird, Blue Bird and Black Bird are angry with the pigs! The pigs stole the bird’s eggs. The birds want their eggs back and will stop at nothing to get them back. The flight path of the birds can be modeled with a parabola. Use “x” as the horizontal distance and “y” as the vertical height, both in feet.

|  |  |  |
| --- | --- | --- |
| **Choice A**  Red & Blue Birds | **Choice B**  Red, Blue & Yellow Birds | **Choice C**  Red, Blue, Yellow & Black Birds |

|  |  |  |  |
| --- | --- | --- | --- |
| **Red Bird:** | **Blue Bird:** | **Yellow Bird:** | **Black Bird:** |

Part 1) **GRAPH -** You need to determine the following information for **each** bird you are assigned. All of this should be clearly shown with a **graph** for **each** bird’s flight path (on the **same** coordinate plane). 🡪

1. Each bird’s **starting location** (labeled coordinate)
2. Each bird’s **ending location** (labeled coordinate)
3. Each bird’s **maximum height** (labeled coordinate)
4. Explain which bird flew the heighest
5. Explain which bird traveled the longest horizontal distance

Part 2) **TABLE -** You need to make a **table** for **each** bird’s flight path:

1. Table of at least 7 values (x & y) including vertex & both solutions
2. Label vertex and zeros on your table. If any cannot be shown on the table, indicate where they would be. (Ex: vertex between x=5 and x=6)

Part 3) **CREATING** - Each member of your group must select a different option from the list below and create an **original equation** that you each write. You may need to experiment with different values on your calculator to make a realistic graph. The equation you make should not be the same as another student’s. Each option should include (a) an original quadratic equation, (b) a graph, and (c) an explanation of why your quadratic fulfills the requirements. These should be labeled by the option that you chose (ex: 1a, 1b, 1c)

Options:

1. A realistic angry bird flight (with coefficient *a* that is not 1) that could not fly over a 10-foot wall
2. A realistic angry bird flight (with coefficient *a* that is not 1) that could fly over a 10-foot wall
3. A quadratic equation that produces a parabola that could not represent a bird’s flight
4. An angry bird starting from a platform instead of the ground
5. An explanation of the effect that changes to the coefficients *a*, *b*, and *c* coefficients have on a bird’s flight, with an example quadratic equation given

Part 4) **FACTORING:** You need to **solve** each quadratic equation (with all work shown) by **factoring**.

1. Give **factors** for each quadratic equation. Include work shown to check your answer.
2. Give **solutions** to each quadratic equation.
3. **Explain** how these solutions relate to your graph (see part 1) & your chart (see part 2).
4. Calculate the **horizontal distance** each bird travelled.

Part 5) **INTERPRET:** Answer the following questions based off the angry birds you were assigned:

1. Which birds, if any, would hit either of the following pigs? **Prove** your answer algebraically or graphically. (Writing “my graph did/didn’t go through that point” does not prove your answer!)

|  |  |
| --- | --- |
| **King Pig located at point (6,24)** | **Moustache Pig located at point (11,35)** |

1. If Mr. T-G built a wall that was 10 feet tall, which of the birds would be able to fly over the wall? Explain how you know this.
2. Based off of your graph, estimate the horizontal distance and vertical height at which the red and blue birds intersect.

Extension Activities:

These may be assigned to you, or you may opt to challenge yourself by doing the extensions.

* **Choice A or B Extension:** What is the smallest *b* value that the Red Bird must have to fly over a 40 foot wall without touching it?
* **Choice C Extension:** What is the minimum initial velocity must the Black Bird have if he must get over a wall that is 12 feet high?